

Application Highlight



2500 Series® Programmable Automation Control System

Revitalizing and Future-Proofing an Original Simatic®/TI 505® Control System with New and Enhanced Backwards-Compatible CTI 2500 Series® Products

Trying to solve a problem with an aging 505-CP2572 that kept losing its Ethernet connection, a leading manufacturer of dry felt contacted CTI for help. Every time the communications card dropped off the network, it resulted in the HMI system losing data and control.

CTI visited the plant and conducted a review of its control systems to determine the cause of the problem. As part of the review, CTI Regional Sales Manager Perry Bright identified several potential issues that could affect the performance and continued sustainability of the system.

Summary

In order to address connectivity problems as well as concerns about the continued sustainability of its control systems, a leading manufacturer of dry felt upgraded several components of its 505 control systems to brand new backwards-compatible CTI products. The result: a Smart Modernization that restored connectivity and delivered new capabilities and a refreshed control system that was installed in a few hours with no programming changes, wiring changes, or changes in the HMI/SCADA system.

Findings

While the entire system was 18+ years old, it still worked very well other than the intermittent problem the customer was having with the Ethernet card. The Simatic/TI 505/CTI 2500 Series system is one of — if not the #1 — most reliable control systems ever made, but even this system needs maintenance to continue functioning reliably. In the case of our customer, some components were still functioning but unable to keep up with current technology, some components were at or



nearing the end of their serviceable lives, and some components had been discontinued by their manufacturers and were increasingly hard to support.

Components Misaligned to Newer Technology



Figure 1: 505-CP2572

- **505-CP2572 cards** — Intermittent problems with these cards are what prompted the initial call to CTI Support. The 505-CP2572 cards in the plant were first-generation Ethernet modules introduced in the mid-1990s, manufactured by CTI, and private-labeled by Siemens. Since their introduction over 20 years ago, Ethernet network traffic has grown exponentially. The original module was designed for 10baseT networks while today's networks generally run at 100/1000Mb. Additionally, older Ethernet cards such as the 505-CP2572 do not have protections from data storms that are all too frequent on today's heavily trafficked Ethernet

networks. CTI recommended immediate replacement of these modules with the current generation of this card — the CTI 2572-B — that has been redesigned and improved to operate effectively in today's faster paced — and more congested — environment.

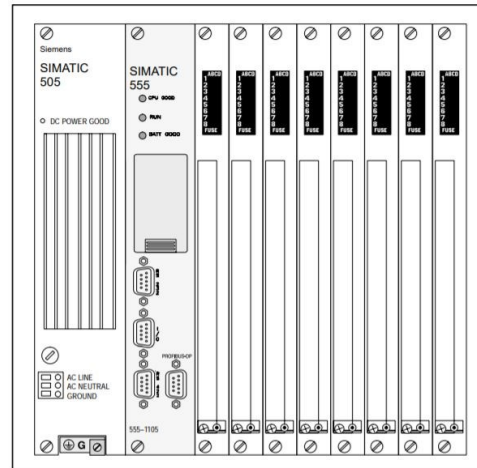
The 2572-B is a fully compatible replacement¹ for the 505-CP2572 and can operate on either 10/100Mb or 100/1000Mb networks. It includes protections for data storms and has much more efficient IP packet handling, resulting in significantly faster transaction speeds compared to the 505-CP2572. It also displays the IP address and includes extensive diagnostic features that did not exist in the original design. These diagnostic features are accessed via a standard web browser and can aid in the detection and correction of network problems which would have been helpful to our customer.



Figure 2: 2572-B

- **505 Series CPUs such as 555-1105** — The customer's 555-1105 CPUs were still operating effectively in their plant. Like the 505-CP2572 cards, however, today's generation of CPUs includes significant upgrades in functionality and capability that CPUs from older generations lack. For example, CTI's 2500 Series 2500-C300 CPU, which is a fully compatible replacement for the 555-1105, offers built-in Ethernet connectivity, a built-in USB port for programming, an SD flash card slot for easy firmware upgrades, a webserver for diagnostics and

significantly faster processing speeds. Given that the customer's CPUs were functioning effectively, CTI recommended replacement of the 555-1105s with new CTI 2500-C300s as the 555-1105s failed or as budget allowed.



Figures 3 (left) and 4 (right): Simatic 505 system with a 555-1105 CPU; New CTI 2500-C300 CPU

Components Nearing the End of their Serviceable Life

- **505-6660 Power Supplies:** The customer had original 505-6660 110VAC power supplies throughout the plant. Given that the industry-recognized life expectancy of the electrolytic capacitors used for energy storage is roughly 10 years, these 18+ year-old power supplies presented a risk to production with failure possible at any time. CTI recommended immediate replacement of these power supplies with the 2512 — CTI's brand new fully compatible power supply.

For more information on the life expectancy of power supplies, please see our Tech Tip: <http://controltechnology.com/Files/common-documents/tech-tips/power/Power-Supply-Tech-Tip>

Components Discontinued and No Longer Supported by their Manufacturer(s)

- **Field Interface Modules (FIM modules or 505-7202):** The customer was using FIM modules connected to Siemens drives using the USS RS485 serial protocol. All three of these components — the FIM modules, the drives and the USS RS485 protocol — have been discontinued by Siemens and are no longer supported. Parts are only available from third-party re-sellers such as eBay. While CTI does not have direct replacements for the FIM modules or the drives, CTI products are available which support updated protocols and are capable of integrating new drives into the existing 505 system. See our recent Application Highlight about



¹ The 2572-B is a direct replacement for the 505-CP2572 in most applications

our customer Collins Products who integrated new variable speed drives into its existing Simatic 505/CTI 2500 Series control system using CTI's high-performance Application Coprocessor — the 2500-ACP1. http://www.controltechnology.com/Files/common-documents/application_highlights/Collins-Products-ACP1-App-Highlight-FINALFINAL

The Results: A Control System Refresh

After reviewing CTI's findings and recommendations, plant and production managers had a better understanding of the reasons for the problems they had been seeing with the Ethernet cards. They were also pleased to discover that they could "refresh" and modernize their control systems with no rewiring or reprogramming, little to no downtime, minimal risk and low cost by simply swapping out aging modules for their brand new, updated CTI replacements.



Figure 5: New CTI 2500 Series System

The customer decided to replace all of its CPUs, Remote Base Controllers (RBCs), power supplies and Ethernet modules with new CTI products. The plug-and-play installation was completed in a few hours without any reprogramming or changes to wiring or to the HMI/SCADA system. The Ethernet problem that prompted the call to CTI in the first place was resolved and the upgraded system has been running reliably for over six months.

In summary, the customer was pleased to resolve a nagging problem with its control system and end up with a like-new control system with updated technology, performance and capabilities at a fraction of the cost — and significantly less risk — of purchasing and installing an entirely new system.

At CTI, that's what we call Smart Modernization.™

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